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Original Research

Bridging the Research–Conceptualization Gap in Service Design Education: A Continuous Idea Generation Approach

Isabelle Sperano, MacEwan University, Canada
Jacynthe Roberge, Université Laval, Canada
Vik Chu, MacEwan University, Canada
Benjamin Kraemer, MacEwan University, Canada

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Abstract: This article explores a pedagogical strategy that aims to smooth the transition from the Research to the Conceptualization stages by incorporating ideation and solution-oriented activities from the beginning of the design process. It presents a case study of a design-led innovation project executed in a service design course in partnership with a community partner (CP) from a public organization. This approach seems to have been successful overall. It also enhanced the ability to trace back the origins of solutions and highlighted the occurrence of multiple creative leaps throughout the project. It emphasizes the importance of external feedback, especially from CPs, in shaping and refining solutions. Additionally, it revealed the complexities involved in solution validation and the necessity for a more structured and robust framework to guide students through this phase, especially when collaborating with large public organizations on complex and systemic issues.

Keywords: *Prospective Design, Design-Led Innovation, Creativity, Idea Generation, Design Education, Service Design, Authentic Learning*

Introduction

In the evolving educational landscape, projects involving community partners (CPs) offer a compelling way to combine classroom learning with real-world applications (Hicks and Radtke 2015). Student design projects, conducted in collaboration with partners seeking to innovate their service offerings and experiences, provide an interesting opportunity to integrate theoretical knowledge with practical and experiential learning. This article presents a case study of an undergraduate service design course, where students collaborated with a CP of a public organization to explore and develop prospective and innovative solutions that would help the organization and improve the overall user experience of their users. This course has been taught three times using this approach, with class sizes ranging from seven to twelve students, varying each semester, over a fourteen-week period. Most students were studying for a Bachelor of Design, and a few were studying either for a Bachelor of Computer Sciences, Social Sciences or Commerce.

The students' mandate was to conduct a design-led innovation project using a human-centered design process. One of the pedagogical goals was to create an encouraging environment for the students to question, envision, and innovate freely while considering a wide range of potential solutions without the pressure of immediate implementation (Stickdorn 2018). For the CP, the intention was to inspire them to follow less conventional paths, directions they seldom have the time and the resources to explore (Dorst 2015; Sanders and Stappers 2012).

This article provides an overall description of the project but primarily focuses on ideation. It examines a design approach that fosters solution-oriented thinking, starting before the Research stage and continuing until the project's conclusion. It also explores the potential influences of this approach throughout the process and its outcomes. It also identifies potential challenges with such an approach. The insights derived from this case study aim to contribute to ongoing discussions on design pedagogy, particularly the role and timing of ideation in project deployment, especially for projects with strong prospective components.

Background and Pedagogical Strategy Proposition

Several design process models, such as the Double Diamond (*Design Council*, n.d.), Design Thinking (Dam and Siang, n.d.), ISO 9241-210:2019 (ISO 2019), Stickdorn (2018) and Cross (2021) break down the design process into distinct phases. While the number of phases and their names may vary from one model to another, the models typically start with a Research stage focused on data collection, observation, and desk research. It is followed by a Design Conceptualization stage geared toward ideation and exploration of design solutions.

The outcome of the Research stage serves as both foundational material and a stepping stone to the Design Conceptualization stage, during which design opportunities are identified and concepts are generated and transformed into concrete solutions. A cohesive transition from the Research to the Design Conceptualization phase is pivotal to design success, enabling knowledge conversion into innovative outcomes.

From Research to Design Conceptualization: A Challenging Transition

Over the past two decades, we have supervised numerous design projects within both undergraduate and graduate-level design programs. These projects have often involved collaborations with CPs and hold many similarities with the course discussed in this article. Reflecting on these experiences, we identified that the shift from the observational and analytical activities of the Research stage to the more creative activities of the Design Conceptualization stage was a recurring hurdle for students. Within this section, we will discuss our previous pedagogical experiences regarding this challenge. Our reflection will encompass both an educational and a theoretical perspective. Subsequently, we will introduce our pedagogical approach to address this challenge.

Transition Bottleneck

In numerous design process models, such as the Double Diamond (*Design Council*, n.d.), one of the most widely adopted frameworks (Prater 2022) and the one we use in this class, the progression from the Research phase to the Design Conceptualization phase is notably short. Although iteration loops are sometimes represented in these design process models, these two phases are often depicted as distinct boxes that unfold one after the other sequentially, as if one must be completed before the other begins.

Additionally, in an educational setting, the timeline is relatively inflexible, constrained by the fixed number of weeks in a semester. Therefore, a specific duration is allocated to each phase of the process, mirroring structured timelines often found in professional settings (Bichard and Gheerawo 2011). This fixed time frame is essential to ensure that students have enough time for thorough research (to understand the context, users, their needs, etc.) (Prater 2022; Bichard and Gheerawo 2011) and time to develop their deliverables. This usually leaves limited time for this transition from Research to Conceptualization.

This perceived rapid transition posed challenges for student designers in effectively bridging these critical stages (Prater 2022). It seemed to constrain their creative flow and made their brainstorming and concept identification process feel rushed.

Disconnected Activities

Students also experienced a sense of disconnection between the Research and the Design Conceptualization stages (Melican 2004). It was as if they were operating in two distinct spheres. This disconnection made it difficult for students to trace a clear path from their research to the specific solutions they were proposing. Mitchell (1993) refers to this phenomenon as the "applicability gap," which manifests as a "tension in the working relationships between user researchers and designers…the space between user research meant to inform design and the actual creative processes of design."

Indeed, when new ideas are being brought forth, design students often have difficulty connecting them to their previous research work and determining why and how they were linked to certain on-ground realities (Kolko 2011; Melican 2004). This seems to be a frequent issue for designers overall. As Kolko (2011) explains, "synthesis conducted in private produces no visible connection between the input and the output. Often, not even the designer himself can articulate the exact value of his design insights" (Kolko 2011, xi–xii). Part of the difficulty would arise from the presence of significant gaps between research and design activities (Kolko 2011).

To progress cohesively in the design process and effectively transition from the research phase to the design phase, the designer must find a way to leap across these gaps, which seems to be a persistent challenge. The classic idea of "the creative leap," which has been considered a core element of the design process for some time (Archer 1965), is often used to refer to this phenomenon. According to Cross (2007), this challenge is not so much about jumping as it is about building a bridge between problem space (needs and requirements) and solution space (ideas and concepts). This view "fits with the appositional nature of design thinking, in that the bridging concept embodies [the search for] satisfactory relationships between problem and solution" (Cross 2007, 13).

Cognitive Shift: From Objective Observers to Imaginative Innovators

The challenge is also about the cognitive shift required to move from gathering and processing information to generating and refining creative ideas. The significant change of perspective involved in moving from an activity focused on understanding the world (research) to an activity focused on transforming the world (conceptualization) is arduous. Switching from being objective observers to imaginative innovators—an activity that Kolko (2011) calls design synthesis—often left students struggling with how their research insights could inform their proposed solutions in a cohesive and logical manner. "Novice designers do not know how to accomplish synthesis, so they flounder through this portion of the design process" (Kolko 2011, XV).

The creative activities involved in this quest for coherence between the Research and Design Conceptualization stages necessarily encompass the cognitive activities of analysis, synthesis, and evaluation.

> [A]nalysis involves the exploration of relationships, looking for patterns in the information available, and the classification of objectives. Analysis is the ordering and structuring of the problem. Synthesis on the other hand is characterised by an attempt to move forward and create a response to the problem—the generation of solutions.…[A]ppraisal involves the critical evaluation of suggested solutions against the objectives identified in the analysis phase. (Lawson 2006, 37)

While these cognitive activities are well known to the design research community, their intentional implementation within the design process remains challenging for students.

Exploring an Alternative Pedagogical Strategy: Early Continuous Ideation

These challenges led us to think that it might be advantageous to gently blur the borders between the Research and the Design Conceptualization stages and instead allow—even encourage—design students to openly engage in idea generation and solution-oriented activities right from the early stages of the design process, even before diving into research.

Concretely, we explicitly injected various ideation and solution-focused activities right at the beginning and throughout the entire design process aimed at facilitating a constant emergence of ideas and solutions that would iteratively enrich the understanding of the concurrently discovered problem (Cross 2008).

This approach is not contradictory to existing models, as many already advocate for an iterative process (*Design Council*, n.d.) that allows revisiting any step of the process when needed. Its distinctiveness lies in its systematic and deliberate integration of idea generation throughout the entire design process. The following section will describe and present this approach in more detail.

Course Design and Timeline

In this section, we present the chronological progression of the course, outlining its key phases and concurrently shedding light on the various ideation and solution-oriented activities that were integrated into the curriculum. This dual exploration serves to provide an understanding of how the course unfolded, with particular emphasis on the ideation processes that punctuated its trajectory.

The course progressed over fourteen weeks (see Figure 1). It was structured into two overarching stages: “Research,” which involves students delving into comprehending the context and uncovering issues, and “Design Conceptualization,” where they conceive a solution and concretize it into a prototype. These stages, in turn, are subdivided into six distinct phases:

1. Project Kickoff
2. Plan and Conduct Research
3. Analyze Data and Present Results
4. Ideation, Solution Section, and Concept Refinement
5. Solution Development
6. Presentation of Solution

Each of these phases includes ideation and solution-oriented activities, identified in Figure 1.

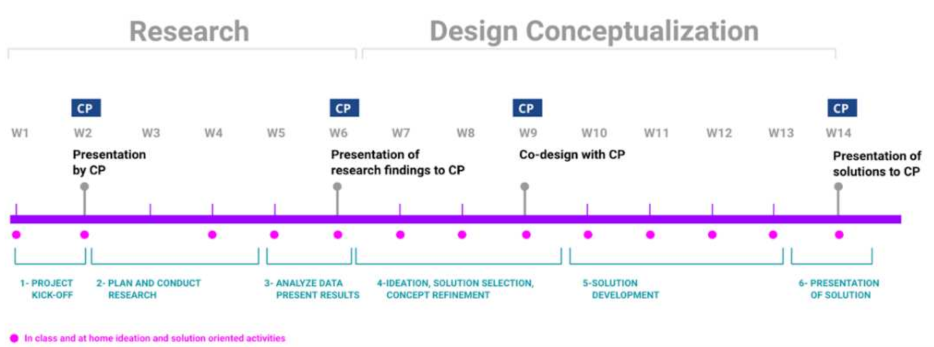

Figure 1: Course Timeline

Project Kickoff

The first phase, Project Kickoff, served as an introduction to the project, setting the stage for the work ahead. During this phase, the organization involved in the project came to the class to present the project. This presentation served as an informative session to acquaint students with the organization's mission, goals, and the specific challenges or opportunities they were interested in addressing through the collaboration with the course. It was a way of helping students gain a deeper understanding of the real-world context they would be working on.

Ideation, opportunity identification, and solution-oriented activities. As part of this introductory phase, in the first week of the class, even before meeting with the CP, students participated in an autoethnography session (Adams, Ellis, and Jones 2017). They engaged in a workshop where they discussed their past experiences and issues with the topic and explored potential ideas and solutions. With their peers, they had to fill out two affinity diagrams. The first diagram was meant to capture elements related to framing the context and the problem space. It was divided into subthemes such as users, needs, interactions, behaviors, tasks, existing products, and channels, using a combination of various frameworks (Martin and Hanington 2012). The second diagram was meant to create a space to explore opportunities, ideas, and solution spaces. It was also divided into subthemes such as Artifact, Feature, Product, Services, and Ecosystem (adapted from Rachieru 2021). The nature of the subthemes varied from year to year, depending on the project context.

This exercise aimed to prompt the identification of issues related to their personal experiences with the topic given to them, to discuss existing products and services, and also to start uncovering potential design opportunities. Additionally, it was a way to introduce the two affinity diagrams that would serve as a framework for most of their process (synthesizing research, opportunities finding, ideation, solution building, collaboration with the group, etc.) and the collaborative online digital whiteboard tool that students would use throughout the project to share their findings and observations with the class, fostering a collective comprehension of the project.

Next, after the initial meeting with the organization, the class engaged in a debriefing and ideation session, using the newly acquired information using two affinity diagrams similar to the previous week. The aim was to encourage collaboration between students, foster idea generation even at a very early stage, and potentially give them insights about planning their research.

Plan and Conduct Research

During this phase, the primary emphasis revolved around the preparation and execution of research activities. To facilitate this process, students formed small research teams, each entrusted with the responsibility of overseeing a particular research method. The intent behind this organizational structure was to ensure that each group could engage deeply in their designated method. A range of research methods was conducted (tailored to each course iteration), such as observation, user tests, interviews (both with users and the CP employees), social media analysis, and comparative analysis. This diverse selection of methods was chosen to provide a holistic approach to research, allowing students to explore various dimensions of the project's landscape.

Ideation, opportunity identification, and solution-oriented activities. At the beginning of this phase, students were provided with a worksheet designed to guide them through the planning and execution of their research. This worksheet included a dedicated section devoted to ideation. Following the completion of any research method, students were encouraged to document any ideas that arose during or after their research activities. The aim was for these ideation entries to serve as a mechanism for capturing insights and creative inspirations that emerged during the research process.

Analyze Data and Present Results

During this phase, students analyzed, synthesized, and organized their research findings and presented their results to the CP. They employed affinity diagrams to scrutinize research data and uncover ideas, solutions, and opportunities.

For each of the designated research methods (observation, interviews, literature review, etc.), every group completed a pair of affinity diagrams, employing the same template utilized in the Project Kickoff phase.

Subsequently, students shared and combined all the affinity diagrams created since the beginning of the project into a single diagram pair to create a visual summary of all the research insights uncovered and ideas identified during the Research phase.

This exercise resulted in a sizable, non-linear, heterogeneous diagram pair. Its complexity underscored a necessity for further formalization and the need to enhance the comprehensibility and coherence of the findings. To accomplish this task, a few students stepped forward to collaborate and create a more coherent synthesis table. The identified issues and important contextual elements were outlined and grouped by themes. Potential opportunities, ideas, or solutions identified during the research phase were associated with each of them. This approach ensured that stakeholders, as well as the students, could readily comprehend the content, thereby facilitating informed discussions and more efficient and strategic decision-making.

The concluding segment of this phase involved the formal presentation of the research findings to the CP. To accomplish this, each research team explained their research methodology and provided a comprehensive overview of their key findings. Toward the end of the presentation, the research synthesis table was presented, offering a summary of the student findings.

To wrap up the presentation and transition into the more solution-oriented stage, a discussion with the CP regarding the research findings and uncovered opportunities took place. This interactive session featured a dot voting activity aimed at prioritizing the identified opportunities. In this exercise, each student was allocated Post-it notes, with the task of designating the most interesting area for them. Simultaneously, the CP employed three distinct types of Post-it notes: “most interesting,” “easier to implement,” and “meets needs of users or the community partner.”

Ideation, opportunity identification, and solution-oriented activities. These diagrams and tables served a dual purpose: on one side, they allowed the recording of identified problems, issues, and challenges during the research phase, and on the other side, they served as a canvas for capturing ideas. These ideas included those generated during the research phase and those that emerged as students engaged in analyzing the research. Cross (2008, 3)says that:

> Design is emergent—relevant features emerge in putative solution concepts, and can be recognised as having properties that suggest how the developing solution-concept might be matched to the developing problem-concept. In design, the solution and the problem develop together, the process is co-evolutionary. The ill-defined nature of design problems means that they cannot be solved simply by collecting and synthesing information.

This pedagogical strategy project mirrored Cross’s insight on the co-evolution of problems and solutions in design. As students engaged with the affinity diagrams and conducted research, their understanding of problems evolved, influencing the nature of the problems they identified. Simultaneously, ideas emerged and evolved within the same framework, reflecting the dynamic interplay between problem exploration and solution generation, which is in line with Cross’s concept of co-evolution in design.

This phase aimed to create a structured understanding of the research outcomes and start selecting potential areas where students would focus for the next stage of the project.

Ideation, Solution Selection, and Refinement

The complexity of its content leads us to present it in two parts. In the first part, teams were involved in ideation and selection of solutions. In the second stage, representatives of the CPs participated in a structured co-design session with students, resulting in the collaborative refinement of the solutions by the students. While its name might not clearly convey it, it is worth highlighting that this phase, in addition to emphasizing ideation, also included research activities such as co-design and user testing.

Part 1: Ideation and Selection of Solution

Ideation, opportunity identification, and solution-oriented activities. Creating those new teams could be seen as the start of an idea-framing activity. During this phase, students were tasked with narrowing down their focus by selecting broad areas they were genuinely interested in working on. This process allowed them to begin honing their direction for the project. It also presented an opportunity to potentially merge two or more areas of interest or discard aspects of the areas they were considering. To achieve this, students engaged in discussions, negotiated their interests, and explored the potential concepts that might become the focus of their collaborative efforts. At this stage, the solutions or potential opportunities were still vague, but students began to focus on a specific problem area.

Then, the ideation activity served as a strategic moment to immerse themselves deeply into ideation and slowly shifting into a solution-oriented mindset. During this activity, students ventured into the realm of actively envisioning and formulating more concrete solutions, propelling them closer to the practical realization of their concepts.

Part 2: Refinement

Following the initial phase of ideation, a delegation of representatives from the organization (between six and ten, depending on the iteration of the course) was invited to participate in a workshop within the classroom setting. To facilitate this exchange of ideas, a structured co-design activity resembling a "world café" was arranged (Schiele et al. 2022). This format was chosen to afford students the opportunity to formally present their conceptual propositions and receive comprehensive feedback from all representatives involved in the session. Some of these representatives possessed prior knowledge of the project, while others were unfamiliar with its specifics. After this interactive session, students worked on refining their solutions to transform their preliminary solutions into more tangible and well-defined products or services.

Ideation, opportunity identification, and solution-oriented activities. This co-design session with the organization representatives, framed within the context of ideation, played a pivotal role in nurturing discussions geared toward solutions. Their contributions and insights were crucial in offering a perspective grounded in professional practices. For example, these contributions facilitated an enhanced comprehension of the pragmatic constraints and considerations that students were not aware of. Additionally, involving participants with diverse roles within the organization revealed a range of priorities, working styles, and vocabularies, which the students learned to navigate. Finally, this session served as a safeguard against prematurely adhering to a solution that would not be relevant or feasible by the CP.

However, it appears that some students encountered difficulties when receiving feedback during this session, particularly when presented in a more critical manner. Such feedback sometimes left them feeling discouraged or uncomfortable following the session. To mitigate this, it could be advantageous to offer students better preparation for what they might encounter during feedback sessions, including how it may affect their emotional responses. Providing them with guiding questions or reflective prompts before or after the session could be beneficial.

Solution Development

In this subsequent phase of the project, students identified various touchpoints associated with their envisioned product or service and started designing various features. Simultaneously, they started thinking about the potential implementation of their solutions and the various actors involved. Additionally, during this phase, students conducted user tests on the products or services they created to assess their functionality and usability.

Ideation, opportunity identification, and solution-oriented activities. In this phase, students worked on developing their solutions, which revealed the emergence of a different facet of ideation. Students now directed their ideation efforts toward a multitude of micro-elements encompassing deciding on which touchpoints to focus on, how to design potential features, what the user interface would be like, and other granular details. These micro-ideas focused on the meticulous crafting of user experiences, user interactions, and the overall functionality of their solutions.

Presentation of Solutions

In this final phase, students presented prototypes of their solutions to the CP. It provided students with an opportunity to unveil the tangible outcomes of a semester-long process.

In the week following the final presentation, the project concluded with a debriefing session conducted between the CP and us. This last meeting served as a project retrospective, facilitating a reflective discourse that included an exploration and evaluation of the presented solutions. It provided a place for constructive feedback and dialogues.

Ideation, opportunity identification, and solution-oriented activities. During this phase, the emphasis shifted toward effectively conveying and presenting the designed solutions to the CP. The focus went beyond the solution itself, extending to the nuances of format, tone, and delivery. Deliberate decisions were made concerning the elements to be included in the presentation to craft a persuasive narrative.

However, during the presentation to the CPs, additional ideas surfaced from both the CPs and the students' side in relation to the solution being showcased. These ideas enhanced depth and added new perspectives to the solutions presented.

Key Insights and Lessons Learned

In this section, we will outline key insights regarding the pedagogical approach explored in this course. We will present the outcomes, discuss the main challenges, and share potential improvements arising from implementing this pedagogical strategy, shedding light on its potential impact in shaping a project.

Smoother Transitions throughout the Design Process

Overall, the pedagogical strategies employed seem to have effectively facilitated a smoother transition from the Research to the Design Conceptualization stage. With this approach, it appears that students gradually enhanced their comprehension of the underlying issues. The process seems to have facilitated the co-evolution of the problems and the solutions (Cross 2008).

With students' comments and feedback about the course, as well as by looking at the affinity diagrams created by students throughout the course, we were able to find the origins of the solutions presented at the term's conclusion. Some of the ideas that led to the solutions presented to the CP originated at the very outset of the course (during the autoethnography exercise in week one and right after the first presentation delivered by the CP). However, these early ideas didn't represent fully matured solutions; instead, they revealed embryonic themes, issues, or ideas that were part of some of the solutions that ended up being developed. Solutions also emerged during the Research stage, others at the beginning of the Design Conceptualization phase, and up to after the co-design session. It's worth highlighting that some ideas and solutions reappeared at multiple points throughout the project, manifesting in various forms at different phases.

Also, ideas exhibited diverse trajectories throughout the course of the project. The end-of-term solutions did not necessarily evolve from the beginning in small, incremental steps. Instead, there were sporadic glimpses of ideas, some of which gradually took shape over time. Interestingly, certain concepts remained dormant until later stages of the process, while others only surfaced during the co-design sessions. Moreover, it's worth noting that, of the multiple ideas generated until the end of the research phase, none of them directly translated into solutions; some were merged to create richer solutions, and others seemed to have functioned as springboards for exploring existing possibilities and envisioning what could potentially emerge, while still others were left unexploited, leaving room for future explorations. It could be beneficial to examine this particular aspect of the project further in future research. A deeper examination of the idea evolution could lead to interesting insights that could be valuable in expanding our understanding of idea evolution.

Although the transition seemed smoother overall, students still encountered some difficulties transitioning to the Design Conceptualization stage, according to students' comments about the class. It appears that while the gap may not have been as pronounced as in our previous courses, it was still somewhat present for some students. There is a possibility that a gap of some kind will consistently exist at that juncture in the design process (Cross 2008). It may be beneficial to engage in discussions with students about its potential inevitability. By raising their awareness of this transitional phase in advance, they can potentially navigate it with less anxiety and greater ease.

Simplified Solution Path Retracing

As indirectly discussed in the previous section, creating these explicit ideation and solution-driven activities throughout the entire design process, externalized, formalized, and organized through the use of affinity diagrams, allowed students to take stock of ideas and discoveries in a structured manner, facilitating the ability to retrace and utilize them effectively. Additionally, these artifacts imbued their process with greater rigor, lent more weight to their ideas, and augmented their argumentative power when presenting their findings to the CP.

In particular, we realized that the Research Synthesis table was of significant importance in structuring and compiling the results and potential opportunities. It seemed to have played a crucial role in bolstering students' confidence in their approach, as it showcased the extent to which they had investigated the solution landscape and how it intertwined with the results of their research. It also gave us more confidence in the solutions students wanted to put forward and develop. Furthermore, it served as a means to present the findings to the stakeholders in a manner that enhanced clarity and coherence.

Although this first attempt seemed to have been successful, there was room for a more rigorous execution. Employing a more meticulous approach to visualize the origins of ideas could have provided even more coherence when presenting solutions to the CPs at the end of the term. To do so, students could explore ways to visually represent the origins, evolution, and development of their solution while also linking them to the results of their research by pinpointing when, where, and how these concepts emerged. This holds the potential to augment the clarity and comprehensibility of the project's narrative.

Igniting Multiple Creative Leaps

This pedagogical approach allowed students to experience multiple creative leaps throughout the project, starting right from the beginning rather than relying on a single one in the middle of the project. These creative leaps were evident right from the beginning, occurring as a sequence of minor steps within each ideation and solution-oriented activity.

The most substantial creative leap still occurred during the transition from Research to Design Conceptualization. However, it did not feel as substantial as in other similar courses. It felt more like crossing a bridge—perhaps intimidating and potentially unstable—than executing a seemingly enigmatic jump, a pattern we have often witnessed in other courses in the past.

Interestingly, the co-design session proved to be an important and unexpected site for a noteworthy creative leap. At the beginning of this session, students arrived with a relatively vague notion of their solutions per our initial instructions. Their ideas were in a formative stage, lacking the depth and clarity required for effective solution development. During the co-design session, students were exposed to a multitude of perspectives from the stakeholders, which encompassed individuals with practical experience and insights related to the project's domain. This diverse array of input included pertinent questions that students had not previously considered, constraints that challenged the feasibility of their ideas, and valuable suggestions that expanded the horizons of their solutions. These newfound insights were instrumental in shaping the direction and scope of their solutions. This unexpected creative leap during the co-design session underscored the significance of collaboration and external perspectives in the design process, demonstrating how valuable external feedback can be in honing and strengthening creative concepts.

Subsequent to this session, the process was marked by a series of incremental yet indispensable creative leaps. These leaps were characterized by a gradual refinement and evolution of the students' ideas and solutions. Although not as dramatic as some earlier leaps, they were equally vital in the overall creative process.

Finally, an interesting effect was observed throughout the final presentations to the CP. During the question and discussion period, other ideas that were linked to the solution presented emerged and were proposed by students and the CP, triggering another creative leap. As mentioned earlier, one of the objectives of collaborating with CPs is to inspire them and explore ideas and avenues that they may not have time to investigate themselves. The productive discussion that resulted from the presentation seems to suggest that this objective was addressed successfully. This also leads us to believe that other creative leaps might occur within the CP teams after the conclusion of the collaboration with our course.

Revealing Solution Validation Challenges

A notable phenomenon surfaced within this process: the challenges of assessing the qualities of ideas and solutions. This particular challenge wasn't entirely new to us; however, the strategy of capturing and tracking ideas from the beginning of the process explicitly revealed the challenge of assessing idea quality because it made the ideation process more visible, complex, and comprehensive, showing nuances that might have been less evident in a less structured approach. Creativity extends beyond merely conceiving ideas and solutions; it involves assessing and validating them. This evaluation process entails considering various criteria to gauge an idea's effectiveness in addressing identified problems, its potential advantages over alternative concepts, and its alignment with potential user needs (Sharon 2016).

For the first stage of the process, no ideas captured in the various affinity diagrams were eliminated. The pool of ideas kept expanding as students advanced through the phases of the process. It was only upon reaching the Design Conceptualization phase that a more explicit and rigorous filtration process commenced. Many students struggled with uncertainty regarding how to identify which solution to put forward or if they should continue exploring further options. Although the discussions with the CP and the decision-making matrices provided helped, a more structured framework with more specific criteria would be beneficial.

We think this complexity was amplified because of the collaboration with a large public organization, particularly on a complex and multifaceted topic. Engaging in solution validation with such an organization introduced a broader set of considerations compared to a hypothetical academic project. Some of the added parameters included the organization's mandate, its available resources, and potential political hurdles. For example, a solution could solve an issue quite effectively and address the needs of users but could be out of the scope of the partner's mandate, or they might not have the necessary resources to bring the idea to life. Assessing solutions effectively through this additional lens requires an in-depth knowledge of the organization, adding another layer of complexity to the students' decision-making process. Moreover, this challenge was acknowledged by one of the CPs, who observed that implementing ideas within a large organization is seldom straightforward, thereby adding complexity to the task of selecting potentially implementable solutions.

The co-design activity was a way of including more of the CPs' perspectives to help students assess their solutions and adapt them to this reality. However, this endeavor also surfaced several intriguing and complex questions that merit further consideration. To what extent should feedback from these expert participants be integrated into the students' final designs? What is the appropriate level of influence these CPs should exert over the solutions proposed? Moreover, what course of action should students take if these expert participants focus solely on the limitations, potential obstacles, or downsides, thereby overshadowing the innovative aspects of the proposed solutions? These questions underscored the complexity of incorporating external feedback into an educational setting, highlighting students' nuanced challenges when attempting to balance academic learning outcomes with practical constraints.

This also raises a broader question. To what extent should a course like this one be concerned that a solution fits neatly within the organization's predefined boundaries? First, the amount of knowledge and the depth or understanding necessary to make informed decisions exceeds the scope of a course like ours, largely due to time constraints. Also, as explained at the beginning of this article, the role of this course transcended the mere generation of ideas that seamlessly conform to established paradigms. Instead, the objective was to initiate innovative solutions and to propel the CP toward thinking beyond the usual confines. We think our unique position grants the course the ability to challenge conventions and present novel perspectives, even if they do not completely align with the organization's constraints. Nevertheless, determining whether a solution is perceived as overly ambitious or strays uncomfortably far from the organization's predefined limits and capabilities presents a unique challenge that could be addressed more in depth in further research.

This particular challenge brought to the course the notion of "windows of opportunity" (Perez and Soete 1988). It refers to specific time frames characterized by favorable conditions or circumstances that facilitate the successful execution of a particular project. These windows of opportunity can arise due to various factors, such as changes in leadership, the implementation of new policies, a new budget, shifts in public sentiment, economic developments, or external events (Lee and Malerba 2017). The ability to identify and evaluate solutions within the context of these windows provides an interesting perspective on aligning user needs with organizational goals. Recognizing and capitalizing on these windows in a timely manner could be an interesting avenue to explore, but, again, requires a strong understanding of the political and social landscape and the skill to position solutions effectively to align with these conditions. Incorporating this notion into discussions with the CP and adding this lens while selecting and developing ideas and solutions could offer an interesting perspective to approaching innovation-centric projects such as this one.

Conclusion

Overall, this pedagogical exploration with early and continuous ideation seemed to have been successful. It fostered an environment where creative thinking was not confined to a single phase but permeated every stage of the project. This allowed students to tap into their creative potential early in their process, changing the ideation dynamics.

While there are still areas for improvement, the process and the outcomes of the project generally received positive feedback from both students and the CP. Some expressed how the course allowed them to develop a real-world application of their design skills and empowered them to think creatively and critically. Moreover, the CP's satisfaction is a testament to the tangible impact the students' solutions had on addressing real issues.

Finally, this exploration led to an unexpected aspect of this early introduction of ideation. Initiating ideation at an early stage inherently means that students engage in the creative process with limited research or in-depth knowledge of the subject matter. They rely on their preliminary understanding and the initial information at their disposal, navigating the design space with what they know at that moment. This approach prompted students to draw upon their intuition, personal experiences, previous knowledge, and immediate perceptions. Within this context, the designer's role transcended beyond being a mere conduit for ideation; they became active knowledge constructors, learning and evolving their understanding through the design process itself. This insight highlights that the early integration of ideation can also be about embedding a continuous learning and adaptation cycle within the design process.

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Ethics Statement

The project is a case study told as a story followed by reflection. This does not meet the definition of "research" as defined in the TCPS2 (Canada). The Research Ethics Board from MacEwan University granted a research ethics exemption.

Conflict of Interest

The author declares that there is no conflict of interest.

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ABOUT THE AUTHORS

Isabelle Sperano: Associate Professor, Department of Design, MacEwan University, Edmonton, Alberta, Canada
Corresponding Author's Email: speranoi@macewan.ca

Jacynthe Roberge: Associate Professor, École de design, Université Laval, Québec, Québec, Canada
Email: jacynthe.roberge@design.ulaval.ca

Vik Chu: Design Student, Department of Design, MacEwan University, Edmonton, Alberta, Canada
Email: chuv4@mymacewan.ca

Benjamin Kraemer: Psychology Student, Department of Design, MacEwan University, Edmonton, Alberta, Canada
Email: kraemerb2@mymacewan.ca